

REMARKS

This paper responds to the Final Office Action mailed on March 21, 2006. Claims 40-58 are now pending in this application.

First §102 Rejection of the Claims

Claims 40-44 were rejected under 35 USC § 102(e) as being anticipated by Carpenter (U.S. 6,810,583). As part of making the rejection, the Examiner states at page 2 of the Final Office Action that

“Carpenter, in figure 6, discloses a substrate comprising: . . . a second conductive layer (C2 , as marked up on figure 6 in appendix "A"); between the second dielectric layer and the third dielectric, the second conductive layer including a first skip via (57) that extends through the first and second dielectric layers; and a third conductive layer (C3) on the third dielectric layer, the third conductive layer including a second via (26) that extends through the third dielectric layer, the second via and the first skip via being stacked on to of one another (see marked up figure 6 in appendix "A").”

Applicant respectfully traverses these assertions. Applicant respectfully refers to the Examiner's marked up drawing which shows that the layer C2 (indicated by the Examiner as the second conductive layer) does not include any vias. Applicant notes that each of the vias is shown as a separate entity from the marked C2 layer. Applicant further notes that each of vias 55, 56, 57, 58 in Carpenter are shown with separate cross-hatching from the corresponding metallizations 21, 31, 28, 29 in the metallic layer 14. Since the vias 55, 56, 57, 58 in Carpenter are not part of the metallic layer 14 (indicated as the C2 layer by the Examiner), Carpenter does not teach or suggest “the second conductive layer including a first skip via that extends through the first and second dielectric layers” as recited in claim 40.

Applicant also respectfully refers to the Examiner's marked up drawing which shows that the layer C3 (indicated by the Examiner as the third conductive layer) does not include any vias. Applicant notes that each of the vias is shown as a separate entity from the marked C3 layer. Therefore, Carpenter does not teach or suggest “the third conductive layer including a second via that extends through the third dielectric layer” as recited in claim 40.

Applicant notes claims 41-44 depend from claim 40 such that claims 41-44 incorporate all of the limitations of claim 40. Therefore, the cited reference does not teach or suggest the

subject matter of claims 41-44 for the reasons provided above with regard to claim 40 (plus other elements in the claims).

Applicant's Comments on Examiner's Response to Arguments

The Examiner states at page 13 of the Final Office Action that

"The applicant argues that layer C2 (second conductive layer) does not include any vias. Therefore, Carpenter does not teach or suggest "the second conductive layer including a first skip via that extends through the first and second dielectric layers". This is not found to be correct. Via (57) as shown in marked up figure 6 (appendix "A"), does extend through dielectric layer D1 and D2 and is connected with the conductive layer (C2)."

Applicant respectfully traverses these assertions in part because even though via 57 extends through dielectric layers D1 and D2 (reference numbers 41 and 43 in Carpenter), and is connected to metallization 28 in metallic layer 14, the via 57 is not part of the metallic layer 14 as indicated by the separate cross-hatching in Figure 6. Applicant notes that the dielectric layer 41 is connected to the metallic layer 14, but Applicant respectfully submits that just as with via 57, the dielectric layer 41 is not part of metallic layer 14. Since the vias 55, 56, 57, 58 in Carpenter are not part of the metallic layer 14, Carpenter does not teach or suggest "the second conductive layer including a first skip via that extends through the first and second dielectric layers" as recited in claim 40.

The Examiner also states at page 13 of the Final Office Action that

"Applicant further argues that layer C3 (third conductive layer in marked up figure 6 (appendix "A")) does not include any via. Therefore, carpenter does not teach or suggest "the third conductive layer including a second via that extends through the third dielectric layer". This is not found to correct. Via (26) as shown in marked up figure 6 (appendix "A"), does extend through the dielectric layer D3 and is connected with the conductive layer (C3)."

Applicant respectfully traverses these assertions in part because even though via 26 extends through dielectric layer D3 (reference numbers 13 and 15 in Carpenter), and is connected to metallization 87 in metallic layer 116, the via 26 is not part of the metallic layer 116 as indicated by the separate cross-hatching in Figure 6. Applicant notes that the dielectric layer 15 is connected to the metallic layer 116, but Applicant respectfully submits that just as

with via 26, the dielectric layer 15 is not part of metallic layer 116. Since none of the vias in Carpenter are part of any metallic layer, Carpenter does not teach or suggest “the third conductive layer including a second via that extends through the third dielectric layer” as recited in claim 40.

Reconsideration and allowance of claims 40-44 are respectfully requested.

Second §102 Rejection of the Claims

Claims 47-51 were rejected under 35 USC § 102(e) as being anticipated by Carpenter (U.S. 6,810,583). As part of making the rejection, the Examiner states at page 4 of the Final Office Action that

“Carpenter, in figure 7, discloses a substrate comprising: . . . a second conductive layer (C3, marked up on figure 7 in appendix "B") between the second and third dielectric layers, the second conductive layer including a first skip via (VI, marked up on figure 7 in appendix "B") that extends through the first and second dielectric layers; a fourth dielectric layer (D4, marked up on figure 7 in appendix "B"), the third dielectric layer being between the second and fourth dielectric layers; a third conductive layer (C4, marked up on figure 7 in appendix "B") between the third and fourth dielectric layers; and a fourth conductive layer (C5, marked up on figure 7 in appendix "B") on the fourth dielectric layer, the fourth conductive layer including a second skip via (V2, marked up on figure 7 in appendix "B") that extends through the third and fourth dielectric layers, the second skip via and the first skip via being stacked on top of one another (see marked figure 7 in appendix "B").”

Applicant respectfully traverses these assertions. Applicant respectfully refers to the Examiner’s marked up figure 7 which shows that the layer C3 (indicated by the Examiner as the second conductive layer) does not include any vias. Applicant notes that each of the vias is shown as a separate entity from the metallizations in the marked C3 layer. Applicant further notes that each of vias in Carpenter is shown with separate cross-hatching from the corresponding metallizations in the metallic layer C3. Since the vias in Carpenter are not part of the metallic layer (indicated as the C3 layer by the Examiner), Carpenter does not teach or suggest “the second conductive layer including a first skip via that extends through the first and second dielectric layers” as recited in claim 47.

Applicant also respectfully refers to the Examiner’s marked up figure 7 which shows that the layer C5 (indicated by the Examiner as the fourth conductive layer) does not include any

vias. Applicant notes that each of the vias is shown as a separate entity from the marked C5 layer. Applicant further notes that each of vias in Carpenter is shown with separate cross-hatching from the corresponding metallizations in the metallic layer C5. Therefore, Carpenter does not teach or suggest “the fourth conductive layer including a second skip via that extends through the third and fourth dielectric layers” as recited in claim 47.

Applicant notes claims 48-51 depend from claim 47 such that claims 48-51 incorporate all of the limitations of claim 47. Therefore, the cited combination does not teach or suggest the subject matter of claims 48-51 for the reasons provided above with regard to claim 47 (plus other elements in the claims).

Applicant's Comments on Examiner's Response to Arguments

The Examiner states at page 13 of the Final Office Action that

“Similarly regarding the independent claim 47, the applicant argues that Carpenter does not disclose or teach the second conductive layer including a first skip via that extends through the first and second dielectric layers and the fourth conductive layer including a second skip via that extends through the third and fourth dielectric layers. This is not found to be correct. Via (V1, as shown in figure 7, appendix B) extend through dielectric layers D1 and D2 and is connected to conductive layer C3. Similarly Via (V2) extend through dielectric layer D3 and D4 and connected to conductive layer C5.”

Applicant respectfully traverses these assertions in part because even though via V1 (as indicated by the Examiner in marked up Figure 7) extends through dielectric layers D1 and D2, and is connected to a metallization in metallic layer C3, the via V1 is not part of the metallic layer C3 as indicated by the separate cross-hatching in Figure 7. Applicant notes that the dielectric layer D2 is connected to the metallic layer C3, but Applicant respectfully submits that just as with via V1, the dielectric layer D2 is not part of metallic layer C3. Since the via V1 in Carpenter is not part of the metallic layer C3, Carpenter does not teach or suggest “the second conductive layer including a first skip via that extends through the first and second dielectric layers” as recited in claim 47.

Applicant also respectfully traverses these assertions in part because even though via V2 (as indicated by the Examiner in marked up Figure 7) extends through dielectric layers D3 and D4, and is connected to a metallization in metallic layer C5, the via V2 is not part of the metallic

layer C5 as indicated by the separate cross-hatching in Figure 7. Applicant notes that the dielectric layer D4 is connected to the metallic layer C5, but Applicant respectfully submits that just as with via V2, the dielectric layer D4 is not part of metallic layer C5. Since the via V2 in Carpenter is not part of the metallic layer C5, Carpenter does not teach or suggest “the fourth conductive layer including a second skip via that extends through the third and fourth dielectric layers, the second skip via and the first skip via being stacked on top of one another” as recited in claim 47.

Reconsideration and allowance of claims 47-51 are respectfully requested.

First §103 Rejection of the Claims

Claims 54-56 were rejected under 35 USC § 103(a) as being unpatentable over Carpenter. The references must teach or suggest all the claim elements. M.P.E.P. § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). As part of making the rejection, the Examiner states at page 6 of the Final Office Action that “Carpenter discloses all the features of the claimed invention as applied to claim 47 above, . . .”

Applicant respectfully traverses this assertion. As discussed above, Carpenter does not teach or suggest “the second conductive layer including a first skip via that extends through the first and second dielectric layers” or “the fourth conductive layer including a second skip via that extends through the third and fourth dielectric layers” as recited in claim 47. Claims 54-56 depend from claim 47 such that claims 54-56 incorporate all of the limitations of claim 47. Therefore, claims 54-56 are allowable for the reasons provided above with regard to claim 47.

The Examiner further states at page 6 of the Final Office Action that

“It would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the circuit board of Carpenter with the third skip via connected to the sixth conductive layer, in order to have desired electric connection for signal, power or ground.”

Applicant respectfully traverses this assertion and notes that the cited reference has no teaching or suggestion as to any of the conductive layers including a via.

Reconsideration and allowance of claims 54-56 are respectfully requested.

Second §103 Rejection of the Claims

Claims 45, 46, 52, 53, 57 and 58 were also rejected under 35 USC § 103(a) as being unpatentable over Carpenter, and further in view of Uchikawa (U.S. 6,531,661) and Asai (U.S. 6,534,723).

Claims 45-46

As part of making the rejection, the Examiner states at page 7 of the Final Office Action that “Carpenter discloses all the features of the claimed invention as applied to claim 40 above.” Applicant respectfully traverses this assertion. As discussed above, Carpenter does not teach or suggest “the second conductive layer including a first skip via that extends through the first and second dielectric layers” or “the third conductive layer including a second via that extends through the third dielectric layer” as recited in claim 40.

Claims 45-46 depend from claim 40 such that claims 45-46 incorporate all of the limitations of claim 40. Since Uchikawa et al. and Asai also do not appear to include these limitations, claims 45-46 are allowable for the reasons provided above with regard to claim 40.

Reconsideration and allowance of claims 45 and 46 are respectfully requested.

Claims 52, 53, 57 and 58

The Examiner further states at page 9 of the Final Office Action that “Carpenter discloses all the features of the claimed invention as applied to claim 47 above . . .” Applicant respectfully traverses this assertion. As discussed above, Carpenter does not teach or suggest “the second conductive layer including a first skip via that extends through the first and second dielectric layers” or “the fourth conductive layer including a second skip via that extends through the third and fourth dielectric layers” as recited in claim 47.

Claims 52, 53, 57 and 58 depend from claim 47 such that claims 52, 53, 57 and 58 incorporate all of the limitations of claim 47. Since Uchikawa et al. and Asai also do not appear to include these limitations, claims 52, 53, 57 and 58 are allowable for the reasons provided above with regard to claim 47.

Reconsideration and allowance of claims 52, 53, 57 and 58 are respectfully requested.

Traversal of Pending 35 USC § 102 & 103 rejections

Applicant respectfully traverses each of the pending 35 USC § 102 & 103 rejections.

Applicant also respectfully reserves the right to traverse any statements that were made in the Office Action relating to the rejections (e.g., under MPEP 2144.04 among other things).

Applicant is expressly not admitting to any assertions made in the Office Action.

Reservation of Right to Swear Behind References

Applicant reserves the right to swear behind any references which are cited in a rejection under 35 U.S.C. §§102(a), 102(e), 103/102(a), and 103/102(e). Statements distinguishing the claimed subject matter over the cited references are not to be interpreted as admissions that the references are prior art.

RESPONSE UNDER 37 C.F.R. 1.116 – EXPEDITED PROCEDURE

Serial Number: 10/646,478

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Title: STACKED VIA STRUCTURE THAT INCLUDES A SKIP VIA

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Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney Andrew Peret at 262-646-7009, or the below-signed attorney at 612-349-9592, to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 13 day of April 2006.

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